

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: Not Yet Assigned

Filing Date: Herewith

Applicants: Akira ARAI, et al.

Group Art Unit: N/A

Examiner: N/A

Title: COOLING ROLL, RIBBON-SHAPED MAGNETIC
MATERIALS, MAGNETIC POWDERS AND BONDED
MAGNETS

Attorney Docket: 9319A-000202

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to the examination of this application, please amend it as follows:

IN THE CLAIMS

Claim 3. (AMENDED) The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a material having a heat conductivity lower than a heat conductivity of the structural material of the roll base at or around room temperature.

Claim 4. (AMENDED) The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a ceramic.

Claim 5. (AMENDED) The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a material having a heat conductivity equal to or less than $80 \text{ W m}^{-1} \text{ K}^{-1}$ at or around room temperature.

Claim 6. (AMENDED) The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a material having a coefficient of thermal expansion in a range of $3.5 - 18 (\times 10^{-6} \text{ K}^{-1})$ at or around room temperature.

Claim 7. (AMENDED) The cooling roll as claimed in claim 2, wherein an average thickness of the outer surface layer of the cooling roll is 0.5 to $50 \mu\text{m}$.

Claim 8. (AMENDED) The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is manufactured without experiencing a machining process.

Claim 9. (AMENDED) The cooling roll as claimed in claim 1, wherein a surface roughness R_a of a portion of the circumferential surface where the gas expelling means is not provided is $0.05 - 5 \mu\text{m}$.

Claim 11. (AMENDED) The cooling roll as claimed in claim 10, wherein an average width of the groove is $0.5 - 90 \mu\text{m}$.

Claim 12. (AMENDED) The cooling roll as claimed in claim 10, wherein an average depth of the groove is $0.5 - 20 \mu\text{m}$.

Claim 13. (AMENDED) The cooling roll as claimed in claim 10, wherein an angle defined by a longitudinal direction of the groove and a rotational direction of the cooling roll is equal to or less than 30 degrees.

Claim 14. (AMENDED) The cooling roll as claimed in claim 10, wherein the groove is formed spirally with respect to a rotation axis of the cooling roll.

Claim 16. (AMENDED) The cooling roll as claimed in claim 10, wherein the groove has openings located at peripheral edges of the circumferential surface.

Claim 17. (AMENDED) The cooling roll as claimed in claim 10, wherein a ratio of a projected area of the groove with respect to a projected area of the circumferential surface is 10 - 99.5%.

Claim 18. (AMENDED) A ribbon-shaped magnetic material which is manufactured by using the cooling roll described in claim 1.

Claim 19. (AMENDED) The ribbon-shaped magnetic material as claimed in claim 18, wherein an average thickness thereof is 8 - 50 μ m.

Claim 20. (AMENDED) A magnetic powder which is obtained by milling the ribbon-shaped magnetic material described in claim 18.

Claim 21. (AMENDED) The magnetic powder as claimed in claim 20, wherein the magnetic powder is subjected to at least one heat treatment during or after a manufacturing process thereof.

Claim 22. (AMENDED) The magnetic powder as claimed in claim 20, wherein a mean particle size of the powder is 1 - 300 μ m.

Claim 24. (AMENDED) The magnetic powder as claimed in claim 23, wherein an average crystal grain size of each of the hard magnetic phase and the soft magnetic phase is 1 - 100 μ m.

Claim 25. (AMENDED) A bonded magnet which is manufactured by binding the magnetic powder described in claim 20 with binding resin.

Claim 26. (AMENDED) The bonded magnet as claimed in claim 25, wherein an intrinsic coercive force (H_{CJ}) of the bonded magnet at room temperature lies within a range of 320 - 1220 kA/m.

REMARKS

The purpose of this preliminary amendment is to clarify the translation for purposes unrelated to patentability and remove multiple dependent claims to reduce filing costs.

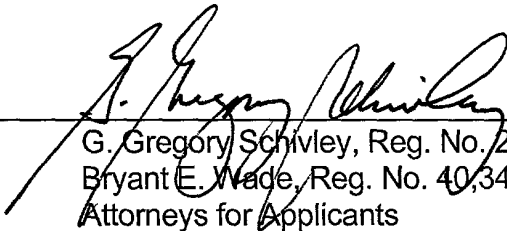
Favorable consideration of this application is respectfully requested.

Respectfully submitted,

Date: April 12, 2001

Harness, Dickey & Pierce, P.L.C.
P.O. Box 828
Bloomfield Hills, MI 48303
(248) 641-1600
GGS/BEW/msm

By: _____


G. Gregory Schivley, Reg. No. 27,382
Bryant E. Wade, Reg. No. 40,344
Attorneys for Applicants

ATTACHMENT FOR CLAIM AMENDMENTS

The following is a marked up version of each amended claim in which underlines indicates insertions and brackets indicate deletions.

Claim 3. (AMENDED) The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a material having a heat conductivity lower than [the] a heat conductivity of the structural material of the roll base at or around [a] room temperature.

Claim 4. (AMENDED) The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a ceramic[s].

Claim 5. (AMENDED) The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a material having a heat conductivity equal to or less than $80\text{W m}^{-1}\text{K}^{-1}$ at or around [a] room temperature.

Claim 6. (AMENDED) The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a material having a coefficient of thermal expansion in [the] a range of $3.5 - 18(\times 10^{-6}\text{K}^{-1})$ at or around [a] room temperature.

Claim 7. (AMENDED) The cooling roll as claimed in claim 2, wherein [the] an average thickness of the outer surface layer of the cooling roll is 0.5 to $50\mu\text{m}$.

Claim 8. (AMENDED) The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is manufactured without [experience of] experiencing a machining process.

Claim 9. (AMENDED) The cooling roll as claimed in claim 1, wherein [the] a surface roughness Ra of a portion of the circumferential surface where the gas expelling means is not provided is 0.05 - 5 μ m.

Claim 11. (AMENDED) The cooling roll as claimed in claim 10, wherein [the] an average width of the groove is 0.5 - 90 μ m.

Claim 12. (AMENDED) The cooling roll as claimed in claim 10, wherein [the] an average depth of the groove is 0.5 - 20 μ m.

Claim 13. (AMENDED) The cooling roll as claimed in claim 10, wherein [the] an angle defined by [the] a longitudinal direction of the groove and [the] a rotational direction of the cooling roll is equal to or less than 30 degrees.

Claim 14. (AMENDED) The cooling roll as claimed in claim 10, wherein the groove is formed spirally with respect to [the] a rotation axis of the cooling roll.

Claim 16. (AMENDED) The cooling roll as claimed in claim 10, wherein the groove has openings located at [the] peripheral edges of the circumferential surface.

Claim 17. (AMENDED) The cooling roll as claimed in claim 10, wherein [the] a ratio of [the] a projected area of the groove with respect to [the] a projected area of the circumferential surface is 10 - 99.5%.

Claim 18. (AMENDED) A ribbon-shaped magnetic material which is manufactured by using the cooling roll described in [any one of claims 1 to 17] claim 1.

Claim 19. (AMENDED) The ribbon-shaped magnetic material as claimed in claim 18, wherein [the] an average thickness thereof is 8 - 50 μ m.

Claim 20. (AMENDED) A magnetic powder which is obtained by milling the ribbon-shaped magnetic material described in claim 18 [or 19].

Claim 21. (AMENDED) The magnetic powder as claimed in claim 20, wherein the magnetic powder is subjected to at least one heat treatment during or after [the] a manufacturing process thereof.

Claim 22. (AMENDED) The magnetic powder as claimed in claim 20, wherein [the] a mean particle size of the powder is 1 - 300 μ m.

Claim 24. (AMENDED) The magnetic powder as claimed in claim 23, wherein [the] an average crystal grain size of each of the hard magnetic phase and the soft

magnetic phase is 1 - 100 μ m.

Claim 25. (AMENDED) A bonded magnet which is manufactured by binding the magnetic powder described in [any one of claims 20 to 24] claim 20 with binding resin.

Claim 26. (AMENDED) The bonded magnet as claimed in claim 25, wherein [the] an intrinsic coercive force (H_{CJ}) of the bonded magnet at [a] room temperature lies within [the] a range of 320 - 1220 kA/m.

Claim 27. (AMENDED) The bonded magnet as claimed in claim 25, wherein [the] a maximum magnetic energy product $(BH)_{max}$ of the bonded magnet is equal to or greater than 40kJ/m³.